Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of Sensible Medical Innovations Request for Waiver of Part 15 of the Commission's Rules Applicable to Ultra-Wideband Devices	)	ET Docket No. 18-39

COMMENTS OF IRIDIUM COMMUNICATIONS INC.

Iridium Communications Inc. ("Iridium") hereby responds to the above captioned Public Notice, which seeks comment on the request of Sensible Medical Innovations Ltd. ("Sensible") for waiver[1] of certain sections of Part 15 of the Federal Communications Commission's ("FCC" or "Commission") rules that regulate ultra-wideband ("UWB") medical imaging devices.

I. INTRODUCTION

Iridium is authorized to operate its non-geostationary satellite orbit ("NGSO") Mobile Satellite Service ("MSS") constellation in the 1617.775-1626.5 MHz band. Iridium operates the largest commercial constellation ever launched into space: a constellation of sixty-six, cross-linked satellites spread across six near-circular orbital planes that converge over the North and South poles. The satellite network offers truly global service, providing communications services to remote land areas, open ocean, airways, and the polar regions, connecting those who cannot be reached by terrestrial wireless or wireline networks. Iridium is currently launching Iridium NEXT, a state-of-the-art satellite system that will boost Iridium's existing capabilities and enable Iridium to provide its customers with extended capacity and higher throughput

[1] Sensible Medical Innovations, Request for Waiver, ET Docket No. 18-39, at 10 (filed Jan. 16, 2018) ("Waiver Request").

services. To date, Iridium has launched forty of the NEXT satellites and anticipates bringing the full constellation of 66-satellites and nine in-orbit spares into operation by the end of 2018.

Sensible proposes to operate its ReDS System UWB devices ("ReDS system") which use stepped-frequency modulation in the 1105-1709 MHz frequency range. Iridium has closely reviewed Sensible's filing and asks that action on Sensible's Waiver Request be deferred until the information identified below has been provided. Iridium also recommends that the Commission place certain operational conditions upon any grant of Sensible's Waiver Request to mitigate the risk of interference to Iridium's operations in the 1617.775-1626.5 MHz band. Moreover, while Iridium appreciates the importance of technologies that can improve the health of patients, including the benefits the ReDS system can bring to patients who suffer from congestive heart failure, any grant of Sensible's Waiver Request should be limited to the underlying facts and should not open the door to additional use of Iridium's frequency band more generally for medical imaging.

II. SENSIBLE MUST CLARIFY INFORMATION BEFORE THE COMMISSION CAN ACT ON THE WAIVER REQUEST

Section 15.513(a) for Frequency Range of Operation. Sensible proposes that the ReDS system operate by stepping through 16 individual frequencies across the 1005-1709 MHz frequency range, requiring a waiver of section 15.513(a) because this band is outside the authorized frequency range for medical imaging systems.[2] While Sensible indicates that the ReDS system would dwell on each frequency for four milliseconds, and have a total sweep time of 85 milliseconds,[3] it does not specify the frequencies that will be used as the device steps through the frequency range. Iridium requests that Sensible be required to provide a list of the

[2] 47 C.F.R. § 15.513(a), requiring the UWB bandwidth of an imaging system be contained between 3100 MHz and 10,600 MHz.

[3] Waiver Request at 10.

specific frequencies it proposes to use during its sweeps. Sensible also indicates elsewhere in its Waiver Request that a single lung fluid content measurement will last approximately 90 seconds.[4] Iridium asks that Sensible be required to clarify how long the ReDS system will operate on individual frequencies and how many sweeps are required to obtain a single lung fluid content measurement.

Sensible suggests that for the purposes of detecting objects or fluid levels, the ReDS system can operate only when in close proximity to or in contact with the human body. While Sensible states that the sensors will be fitted within a vest to ensure proper alignment to obtain lung fluid measurements, the Waiver Request notes that future versions of the ReDS system may not resemble a vest.[5] In the past, the Commission has allowed a device "to operate only when the device is in contact with the body so that emissions from the device are radiated toward the body."[6] To reduce the possibility that the ReDS system will interfere with Iridium's operations or other operations in the 1005-1709 MHz band, and consistent with a condition included in the Kyma Waiver Order, Iridium requests that the Commission require that the device only be allowed to transmit data when it is in contact with the human body.[7]

Waiver Request of Sections 15.31(c) and 15.521(d) measurement procedures. Iridium does not oppose waiving the requirements of 15.31(c) to permit Sensible to take measurements while the ReDS system is stepping through the 1105-1709 MHz frequency range.[8] The

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[4] *Id.* at 4.

[5] *Id.* at 3, n.8.

[6] *Kyma Medical Technologies Ltd. Request for Waiver of Part 15 of the Commission's Rules Applicable to Ultra-Wideband Devices*, Order, 31 FCC Rcd 9705, 9713 ¶ 28 (OET 2016) ("Kyma Waiver Order").

[7] *Id.* at 9714 ¶ 31.

[8] Waiver Request at 9-10.

Commission has waived this requirement in the past to allow stepped frequency sensors to take measurements with the sweep active.[9]

Sensible also requests a waiver of section 15.521(d) which requires the average power measurements of the UWB device to be made using a 1 millisecond averaging time.[10] Although Sensible states that its system will comply with the average emission limit despite the fact that it will not use the required averaging time, Iridium is concerned about the potential power level emitted from the device. Increasing the averaging time interval to 50 milliseconds as Sensible did in its analysis, leads to the equivalent of a 17 dB increase in average power as compared to the 1 millisecond averaging time required in the rules for all UWB devices. This increase in average power could increase the probability for harmful interference for other operations in Sensible's proposed band. There is no Commission precedent for waiving the averaging time or the permitted average power. Given the potential increase in harmful interference and the lack of precedent, the Commission should proceed cautiously when considering a waiver of the averaging time requirement contained in section 15.521(d).

Section 15.503(d) Definition of "Ultra-Wideband Transmitter." Iridium does not object to Sensible's request for waiver of the definition because as a stepped-frequency device, the ReDS system does not meet the FCC's requirement to meet the fractional bandwidth or the minimum bandwidth requirement at "any point in time."[11] Sensible explains that its ReDS system does span frequencies in excess of the minimum bandwidth. The FCC has found in prior waiver proceedings that the risk of interference is not increased so long as the duty cycle and

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[9] Kyma Waiver Order, 31 FCC Rcd at 9713-14 ¶ 31.

[10] Waiver Request at 9.

[11] *Id.* at 6.

dwell time on a particular frequency do not increase the average power in the band.[12] Iridium does not object to waiving the "at any point in time" portion of the UWB definition for the ReDS system.

Conditions of grant. In past UWB waivers, the Commission has included certain conditions on the grants to ensure that other operators in the proposed band are adequately protected against interference.[13] If the FCC decides to grant Sensible's Waiver Request, Iridium requests that the Commission include the following conditions consistent with past precedent:

- The ReDS system shall be certified by an authorized Telecommunications Certification Body.
- The ReDS system shall operate with stepped frequency modulation in 16 steps between 1005 MHz and 1709 MHz.
- The ReDS system dwell time on any one frequency shall not exceed 4 milliseconds in any 85 millisecond period.
- Measurements of emissions from the ReDS system shall be conducted with the stepping function active.
- The UWB operations permitted under this waiver are limited to body imaging measurement functions; the ReDS system may not transmit data using UWB techniques.
- Measurements of emissions from the ReDS system shall be conducted using a phantom body as described in the request for waiver.
- The ReDS system should be enabled to transmit only when the patient is actively being monitored.
- The ReDS system must cease transmissions when not in contact with the human body.
- The ReDS system must be used under the direction of a healthcare professional.

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[12] Kyma Waiver Order, 31 FCC Rcd at 9708 ¶ 9; *Curtiss-Wright Controls Inc. Request for Waiver of Part 15 of the Commission's Rules Applicable to Ultra-Wideband Devices*, Order, 28 FCC Rcd 12174, 12175-76 ¶ 4 (OET 2013).

[13] Kyma Waiver Order, 31 FCC Rcd at 9713-14 ¶ 31.

- The ReDS system shall comply with all other technical and operational requirements applicable to UWB medical imaging devices under Part 15, Subpart F of the Commission's rules.

- The ReDS system shall not operate more than [20] times per day, each time for a duration not to exceed 90 seconds.

- Sensible Medical Innovations is required to notify both health care providers and patients, by clear and prominent instruction in the ReDS system users' manual, that the ReDS system should be turned off on aircraft.

III. CONCLUSION

Iridium appreciates that medical technologies can improve the health of patients, especially those that are suffering from congestive heart failure. However, the Commission should defer any action on the Waiver Request until Sensible supplements its technical showing as discussed above and until the Commission is satisfied that the proposed ReDS system will adequately protect Iridium's operations. Additionally, any grant of Sensible's Waiver Request should be subject to the conditions identified above and should not open the door to the use of Iridium's 1617.775-1626.5 MHz band for medical imaging more generally.

Respectfully submitted,

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